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REVIEW OF THE SUBSPECIES
OF THE SUNBIRD

Nectarinia jugularis

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The sunbird *Nectarinia jugularis* is a common, widespread species in the Philippine Islands, frequenting brushlands, second growth, coconut groves, and beach scrub. There are in the Philippines more than 7,000 islands, on many of which this sunbird probably occurs. Though many of the islands are close to each other, each one has a certain amount of isolation that probably has produced on each a population at least slightly different from that of every other. The proximity of the islands and the habitat of the birds are such that crossing of individuals from island to island probably occurs. This would tend to reduce differences between island populations, or to increase variability in them.

It has been customary since the time of Shelley (1876-80) and McGregor (1909) to recognize two well-marked races of this sunbird in the Philippines: *N. j. aurora* from the Palawan group and *N. j. jugularis* from the rest of the islands, the Philippines proper. The variability of certain characters—the steel-blue tips on the forehead, the orange on the breast—and the instability of the maroon and black line on the breast were noted by Shelley. McGregor (op. cit., p. 656), quoting from Bourns and Worcester, comments on the variability in the under parts in birds from the Philippines proper, and relegates to synonymy the names Grant in 1894 and Mearns in 1905 and 1909 had used to point out geographical variation. Delacour and Mayr (1946, pp. 230, 280) also recognized only the two races from the whole Philippines.

A recent survey of material from the central Philippines revealed that differences between birds from certain islands seemed to be great enough to warrant subspecific recognition. To augment the material for study the American Museum of Natural History in

New York and the United States National Museum in Washington kindly lent their Philippine series of this species. In all, some 225 specimens were examined.

It was soon apparent that the geographical variation was such as to require more than two subspecific names, but it was also evident that every island population differed from every other, and that it would be confusing and misleading to name every population. The main trends in variation are as follows: The populations from the central Philippines are variable, and compared with them the populations to the east (Palawan, etc.) are sharply characterized by a much wider and more distinct orange breast band; the northern Philippine populations (northern Luzon) are smaller, the orange on the breast is usually absent, the under parts are paler yellow and the upper parts paler and duller grayish-brown tinged with olive; the extreme southern populations (Sulu Archipelago) lack the orange, the under parts are richer yellow, and the greenish-olive upper parts have more of a golden tinge.

The characters of these three extreme populations are all adumbrated in the populations in the central Philippines. The Palawan extreme with its extensively orange breast band is rather sharply set off, and a cline does not appear to be involved. The small pale northern populations, with little or no orange on the breast, appear to be at the extreme of a character gradient, and the richly colored southern birds, without orange on the chest, are another extreme of a cline running south through Mindanao and Basilan to the Sulu Archipelago. Subspecific names for the birds of the central Philippines and also for the three extremes (for all four of which names are available) are useful in discussing the variation.

These names are *N. j. jugularis* for the birds of the central Philippines; *aurora* for those of Palawan; *obscurior* for the northern Luzon birds; and *woodi* for the Sulu birds. Majority opinion would probably support this treatment as far as it goes. But some "splitters" might want to separate stages in the clines. It would perhaps be possible thus to separate the Mindanao birds (for which the name *mindanensis* Mearns is available) and also to separate the southern Luzon birds and those of adjacent islands (under the name *N. j. jugularis*) from those of the more central islands (for which the name *dinagatensis* is available). But the advisability of such a course is doubtful. The central Philippine Islands would still include a number of differing populations, and the individual variations of the birds on an island such as Panay nearly cover the whole

range of variations of *jugularis*, *dinagatensis* and *mindanensis*. So it seems advisable to group the three under the oldest name, *jugularis*.

In addition to the characters mentioned above, iridescent blue-black feathers appear on the forehead of adult males, probably sporadically throughout the population; in our material it is present in only two specimens, one from Sitauki Island, Tawi-tawi, and one from Culion. In each case it is correlated with the presence of a black superciliary line. Shelley recorded steel-blue on the forehead for Palawan birds, and for a Basilan and a Cebu specimen; and Mearns (1905) recorded it for a Dinagat specimen.

An iridescent or a blackish superciliary line or an incipient superciliary also occurs sporadically, but with more frequency than an iridescent forehead; and on certain small islands it apparently predominates over the non-superciliary condition. In our material it is present as follows:

	Present	Absent	Incipient
Palawan.....	1	7	..
Dumaran Island.....	1	..	..
Culion.....	1 (pronounced)	1	..
	3 (small)	..	..
Cagayancillo.....	2	..	..
Northern Luzon.....		7	1
Southern Luzon.....		14	5
Mindoro.....		1	3
Masbate.....	2 (small)	2	..
Ticao.....		6	1
Romblon.....	1 (small)	1	..
Panay.....	1 (pronounced)	4	..
Bucas.....		1	1
Negros.....		12	5
Mindanao.....	1	16	..
Basilan.....		4	3
Sulu.....	4 (pronounced)	..	2

Though this character does predominate in two areas, in the Sulu Archipelago and in Culion and Cagayancillo, in view of the short series and the manner in which it appears sporadically elsewhere it probably should not have much taxonomic weight attached to it.

In some males a line of maroon, brownish- or blackish-tinged feathers gives an interrupted line across the breast at the edge of the metallic throat. This seems more common and pronounced in the northern islands.

A difference in iridescence of the throat has been mentioned. There seems to be no geographical variation in this, but wear changes it from bluish to purplish in the central part of the throat.

The four subspecies that it seems advisable to recognize are as follows:

Nectarinia jugularis jugularis Linnaeus

Certhia jugularis Linnaeus, 1766, Syst. Nat., ed. 12, p. 185—Luzon, Philippine Islands.

Cyrtostomus dinagatensis Mearns, 1905, Proc. Biol. Soc. Wash., 18: 5—Dinagat, Dinagat Island, Philippine Islands.

Cyrtostomus jugularis mindanensis Mearns, 1908, Proc. U. S. Nat. Mus., 36: 443—Zamboanga, western Mindanao, Philippine Islands.

Diagnosis.—This subspecies comprises a series of populations, quite variable within populations, and from population to population. In general these birds are moderately yellow below, with or without a distinct orange area on the chest, and above they are moderate grayish-olive to deeper olive or greenish-olive.

MEASUREMENTS

	Wing		Culmen	
	Male	Female	Male	Female
Southern Luzon				
Manila.....	53, 55	....	20, 20	....
Taal Volcano.....	....	50, 51	....	20, 21
Santa Cruz.....	57	....	21	....
Laguna de Bay.....	55	....	21	....
Near Magdalena.....	....	51	....	....
Pansipit River.....	56	51	21	....
Tayabas.....	54, 55, 55, 57, 58	52	21, 21, 21	20
Camarines.....	56, 56, 56, 57	....	21, 22, 22	....
Albay.....	59, 61, 61	55, 56	21, 21	20, 20
Sorsogon.....	57, 59	....	21, 22	....
Central Philippines				
Mindoroto Samar, Bucas (off Surigao) and Siquijor.....	(31) 54-59 (av. 57.2)	(12) 51-55 (av. 52.5)	(28) 20-24 (av. 21.2)	20-21
Mindanao.....	(10) 54-61 (av. 55.5)	(8) 50-55 (av. 53.2)	(9) 20-22 (av. 20.5)	(8) 18-20 (av. 19.3)
Basilan.....	57, 57, 57	52, 53	20.5, 21.5	20

Range.—Central Philippines, from southern Luzon (north to Manila) south to Mindanao and Basilan. The most northern birds show a slight tendency toward the more northern race *obscurior*, the Mindanao birds a slight and the Basilan birds a pronounced tendency toward the Sulu Archipelago race *woodi*.

Remarks.—*N. j. dinagatensis* was characterized as intermediate between *aurora* and *jugularis* in the color of the breast. Compared with *jugularis* it was said to be similar, but with chest orange in-

stead of yellow, and rest of under parts deeper yellow. In the description the superciliary was said to be metallic black, and the type to have a metallic violet-purple forehead.

N. j. mindanensis was characterized as most closely resembling *N. j. jugularis* of Luzon, but slightly larger, with upper parts olive-green instead of brownish olive-gray; under parts nearly uniform lemon yellow instead of canary yellow.

Size variation between these populations is slight, though those forms near the north edge of the range of this subspecies (Manila area) are slightly smaller (i.e. with shorter wing)—a tendency toward the smaller, paler, northern race. But Mindanao birds are not different from most of the central Philippine birds in size.

Individual variation in color of upper parts and under parts is considerable, and more prominent in some populations than others. It is well shown by the five Panay males; the most richly colored bird has a large area of orange on the breast, and the upper parts are rather bright golden greenish-olive; another bird, with less orange on the chest, has considerably greener upper parts, while another bird has a paler yellow breast, without orange, and more grayish-olive upper parts. The individual variation in this series nearly covers the range of variation in all populations included here. Though variation occurs in all populations it is not always as pronounced as in the Panay series, and in looking at series from island after island it seems that every population could be diagnosed as slightly different on the basis of present material. But the characters repeat themselves, and a population that is quite different from its nearest neighbor may be more like a more distant one; for instance, Ticao Island lies between Masbate and Sorsogon (on Luzon) and has a rather distinct population on the basis of average pale yellow under parts and grayish-olive upper parts, while Masbate birds are much greener above and richer yellow below and the Sorsogon birds are also richly colored below.

In attempting to map the geographical variation and to remove the personal element as much as possible, the males were laid out, on the basis of the color of the under parts, into four series, each series being one stage on the series from light to richly colored. In doing this, place of origin was disregarded. Each series was given a number as follows: I, under parts pale yellow; II, under parts moderate yellow; III, under parts rather richly yellow with a slight tinge of orange on the chest; IV, under parts like III but with conspicuous orange on the chest. These four series were then turned

over, and on the basis of the color of the upper parts, again disregarding the place of origin, each was arranged in a series of groups showing grades of variation, and each given a letter as follows: A, pale grayish-olive; B, deeper grayish-olive; C, dull greenish-olive; D, bright greenish-olive. These sixteen categories did not exhaust the total variation, but seemed all that was practical. A few of the pale yellow birds had a touch of orange on the chest. On the upper parts wear and fading seemed more evident than on the under parts, and the grouping is perhaps less reliable on that account. A category with a slightly golden or brownish-tinged olive back was found impractical. Another person might allocate differently many of the specimens, but I doubt that the pattern would be materially changed. In general, the average differences between consecutive numbers or letters is less than the difference commonly used in separating subspecies (i.e. I, II, or A, B), but the amount of difference between alternative numbers or letters (i.e. I, III or II, IV, or A, C, or B, D) is as great as that often used to separate subspecies, when constant for populations. The results of these groupings were tabulated by location as follows, the number in parentheses being the number of specimens of that type from that area:

Southern Luzon

Manila-Santa Cruz area.....	IB (3), IID (1), IIIB (2)
Tayabas.....	IA (2), IB (2), IIIC (1)
Camarines.....	IIIB (1), IIIC (2)
Albay.....	IIB (3), IVD (1)
Sorsogon.....	IVB (2)
Ticao.....	IB (3), IIB (2), IIIB (1)
Masbate.....	IIID (3), IVD (1)
Samar.....	IIIC (1), IVC (1)
Jinamoc (near Samar).....	IIID (1)
Bucas.....	IVD (2)
Mindoro.....	IID (3), IIID (1)
Marinduque.....	IA (1)
Romblon.....	IA (1), IIID (1)
Panay.....	IA (1), IIIB (1), IVC (2), IVD (1)
Guimaras.....	IB (1)
Negros.....	IB (1), IIC (2), IID (1), IIIC (7), IIID (2), IVC (2), IVD (1)
Cebu.....	IIID (1)
Siquijor.....	IIIB (1), IVD (1)
Mindanao.....	IC (5), ID (2), IIC (3), IID (3), IIIC (6), IIID (4)

These data are also plotted on the accompanying map. From this, one can see that no two populations are precisely alike. There

is a tendency for the more orange-breasted birds to be concentrated in the central part of the islands, and the darker and greener-backed birds in the southern part. The range of individual variation and the mosaic or checkerboard distribution of the characters is such that the ends of conventional taxonomic treatment and the use of subspecific names are best served by regarding all these varying populations as one subspecies. To go further, an immense amount of additional material and another approach than separability would be necessary.

The Basilan birds are not included in the above, as there is a slight tendency toward further rich yellowness below and a golden or yellowish tinge to the olive-green back, which is a tendency toward the race in the Sulu Islands. Indeed, the position of the Basilan birds is intermediate, and their present grouping is somewhat arbitrary.

In the females there is less individual variation, and though the series are smaller, there appears to be less geographical variation. On the upper parts they may be grayish-olive to rather bright greenish-olive, from the same locality, as with the males. Six of the seventeen Mindanao females have a more golden tinge to the greenish-olive upper parts, an approach to the more pronounced condition in the Sulu Island birds (*woodi*) and this is also found in the intermediate Basilan birds. On the under parts the Mindanao females average deeper yellow than females from more northern islands, though they can be matched in this by some of the most deeply colored birds from as far north as southern Luzon (Albay Province and Taal Volcano). In color of under parts the Basilan birds are intermediate between Mindanao and Sulu birds (*woodi*).

Specimens examined.—157 (U.S.N.M., 82; A.M.N.H., 43; C.N. H.M., 32): Southern Luzon, 20 males, 6 females (Manila, 2 males; Rizal, 1 male; Santa Cruz, 1 male; Laguna de Bay, 1 male; near Magdalena, 1 female; Taal Volcano, 2 females; Pansipit River, 1 male; Tayabas, 5 males, 1 female; Camarines, 3 males; Albay, 4 males, 2 females; Sorsogon, 2 males); Catanduanes, 1 male; Marinduque, 1 male, 1 female; Mindoro, 4 males; Ticao, 6 males, 4 females; Masbate, 7 males, 2 females; Samar, 2 males, 4 females; Basiao (off Samar), 5 females; Jinamoc (Leyte-Samar), 1 male; Romblon, 2 males, 1 female; Panay, 6 males, 4 females; Guimaras, 1 male, 2 females; Negros, 16 males, 6 females; Cebu, 1 male; Siquijor, 2 males; Bucas (off Surigao), 2 males, 1 female; Mindanao (includ-

ing Talicud and Buluan Islands), 26 males, 11 females; Basilan, 9 males, 3 females.

***Nectarinia jugularis obscurior* Ogilvie Grant**

Cinnyris obscurior Ogilvie Grant, 1894, Bull. Brit. Orn. Cl., 3: 1—northern Luzon.

Diagnosis.—Distinguished from all the other Philippine races by the paler yellow of the under parts, more pronounced in the female than in the male (only two of the males have a trace of orange on the breast), by the duller grayish-brown-olive of the upper parts, and by the shorter wing.

Measurements.—Wing: 8 males, 51–56 (av. 52.5 mm.); females, 49, 50, 50, 51, 51. Culmen: 7 males, 20.5–22 (av. 21 mm.); females, 19, 20, 20, 21 mm.

Range.—Northern Luzon, south at least to Union and Nueva Vizcaya Provinces.

Remarks.—Ogilvie Grant characterizes this form as like *N. j. jugularis*, but smaller, with upper parts more grayish and bill shorter. Later (1894, p. 514) he stresses the grayer upper parts and the paler yellow under parts, evident in both sexes, but then says the culmen is narrower at the base. The color characters and small size (wing) hold in the present material, but I can not see the postulated bill character.

There is some variation in the series; in the eight males one (Union Province) has barely a trace of green in the brownish-olive back, while another, at the other extreme of variation, has the grayish-olive distinctly greenish-tinged (Ilocos Norte). None has any iridescence in the forehead, or a black superciliary, though one bird (Abra) has an incipient superciliary line indicated by a few black iridescent feathers above the posterior border of the eye. On the under parts the iridescent throat varies from almost all bluish green, with only a tinge of purple, to mostly violet in the central part, a matter of wear. All the males have a narrow, more or less broken line of brown just posterior to the iridescent throat, and in color this varies from olive brown to reddish brown. The intensity of the yellow under parts varies, and one of the specimens has a small area of orange on the central part of the upper breast (Ilocos Norte), and another a tinge of it (Abra). There is less variation in the five females.

When this race is compared with the others for overlap, the five females can be separated from all other females on the paler yellow

of the under parts. The orange in the breast of two male specimens is a condition common in the central Philippines, and these two and two other males could be confused with a few paler specimens of *N. j. jugularis*, but the other four can be separated on color from all *N. j. jugularis*, and on the basis of color and size, the race is fairly distinct.

Specimens examined.—14 (U.S.N.M., 8; A.M.N.H., 6): Northern Luzon, Union Province, 1 male adult; Benguet Province, 2 male adults; Nueva Vizcaya Province, 1 male adult, 1 female; Abra Province, 1 male, 1 female; Ilocos Norte, 3 males, 2 females; northern Luzon, 1 male, 1 female.

***Nectarinia jugularis woodi* Mearns**

Cyrtostomus jugularis woodi Mearns, 1909, Proc. U. S. Nat. Mus., 36: 444—one of the "Three Islands" south of Sibutu Island, Philippine Islands.

Diagnosis.—Compared with *N. j. jugularis* differs in the deeper, richer yellow of the under parts evident in both male and female, but more pronounced in the latter, and in the darker and more golden-tinged greenish-olive upper parts.

Measurements.—Wing: male adults, 53, 54, 55, 57, 58; females, 52, 53, 53, 53, 54, 55. Culmen: male adults, 21.5–22; females, 19, 20, 20.5, 21.

Range.—The Sulu Archipelago; Basilan birds are intermediate, and their allocation to either *woodi* or *jugularis* is arbitrary. Here they are included with *jugularis*.

Remarks.—This race represents the extreme of a cline. One adult male has scattered iridescence on the forehead, four have distinct dark superciliary lines, and two have one indicated (the seventh is doubtful because of the make of the skin). I have attached little taxonomic importance to these characters, as they appear sporadically through other populations, though they do predominate in certain areas, as here in the Sulu Archipelago, and also in Culion (Calamianes group) and Cagayancillo (Cagayan group). Individual variation is slight in this series. None has orange in the breast.

Specimens examined.—13 (U.S.N.M.): Dammi Island, 1 male; Balue Balue Island, Sulu Sea, 1 female; Sitanki Island, Tawi-tawi, 1 male, 2 females; Papahag Island, Tawi-tawi, 3 males, 2 females; Sulu (Jolo), 2 males, 1 female.

***Nectarinia jugularis aurora* Tweeddale**

Cyrtostomus aurora Tweeddale, 1878, Proc. Zool. Soc. London, p. 620—Puerto Princesa, Palawan.

Diagnosis.—This is a very distinct race, compared with all the other Philippine races, on the basis of the bright orange band on the upper breast of the male, next to the metallic color of the throat.

Measurements.—Palawan: wing, male, (8) 55–58 (av. 56.6), female, (10) 52–55 (av. 53.4); culmen, male, (7) 21–22 (av. 21.4), female, (10) 19–21 (av. 20.3). Calamianes group: wing, male, 55–57, female, 53; culmen, male, 22–22.5, female, 20. Cuyon Islands: wing, male, 57; culmen, male, 21–21.5. Cagayan Islands: wing, male, 56–57; culmen, male, 21–22.

Range.—Palawan Island, Calamianes group, Cuyon Islands, and Cagayan Islands.

Remarks.—Though some central Philippine birds have orange on the chest, in none does the amount equal that in *aurora*. The yellow of the under parts is rather pale yellow, and this is equally true of fourteen of the sixteen Palawan females. But the two females taken by Worcester in 1887 and labeled “Palawan” are conspicuously richer yellow below. That this is due to the age of the skins is doubtful, for 1898 skins are pale.

Specimens examined.—41 (A.M.N.H., 2; U.S.N.M., 12; C.N.H.M., 27): Palawan, 9 male adults, 2 male immatures, 16 females; Dumaran Island, 1 male adult; Calamianes Islands (Culion), 5 male adults, 3 females; Cuyon Islands (Cuyo), 3 male adults; Cagayan Islands (Cagayancillo), 2 male adults.

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